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CAECIDOTEA CAROLINENSIS, N. SP., THE FIRST SUBTERRANEAN WATER SLATER FROM NORTH CAROLINA (CRUSTACEA: ISOPODA: ASELLIDAE)

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Abstract.—Lewis, Julian J., Department of Biological Sciences, Old Dominion University, Norfolk, Virginia 23508, and Bowman, Thomas E., Department of Invertebrate Zoology, Smithsonian Institution, Washington, D.C. 20560.—*Caecidotea carolinensis* is described from a tectonic cave in the Piedmont Province of North Carolina. It is closest morphologically and geographically to *C. richardsonae* and *C. catachaetus*, inhabitants of the Appalachian Valley and Ridge Province.

Only one asellid species has been authentically reported from North Carolina. *Caecidotea forbesi* (Williams), widespread in the east-central United States and in southern Ontario, was recorded from Chapel Hill, Durham Co., by Williams (1970). *C. attenuata* (Richardson) occurs in the Virginia part of the Dismal Swamp and may be presumed to occur in the North Carolina part also (Williams, 1970). *C. forbesi* and *C. attenuata* are both epigean species with well developed eyes, and the new species described herein is the first subterranean asellid to be reported from North Carolina. It is noteworthy that it was found in a tectonic (fissure) cave rather than in a limestone solution cave.

Caecidotea carolinensis, new species
Figs. 1–4

Material examined.—North Carolina, McDowell Co., Bennett's Mill Cave, ca. 6 miles (9.7 km) E of Marion, leg. Cato O. Holler, 19 March 1977: Holotype, 7.4 mm ♂, USNM 169989, in alcohol and on 2 slides. Paratype, 5.9 mm ♂, USNM 169990, in alcohol. Paratype, 5.5 mm ♂, USNM 169991, in alcohol and on 5 slides, exuvia in alcohol.

Description of ♂.—Small, eyeless, unpigmented. Length up to at least 7.4 mm; body slender, linear, about 4.4 times as long as wide; coxae all visible in dorsal view. Margins of head, pereonites and telson moderately setose; shorter setae scattered on dorsum as in Fig. 1b. Head about 1.6× as wide as long; anterior margin concave; postmandibular lobes moderately produced. Telson about 1.5× as long as wide; sides subparallel; caudomedial lobe produced as broad arc.

Antenna 1 reaching proximal margin of last segment of antenna 2 peduncle; flagellum with 9–11 segments, 3 terminal segments each bearing single esthete. Antenna 2 about 0.9× as long as body (excluding uropods);

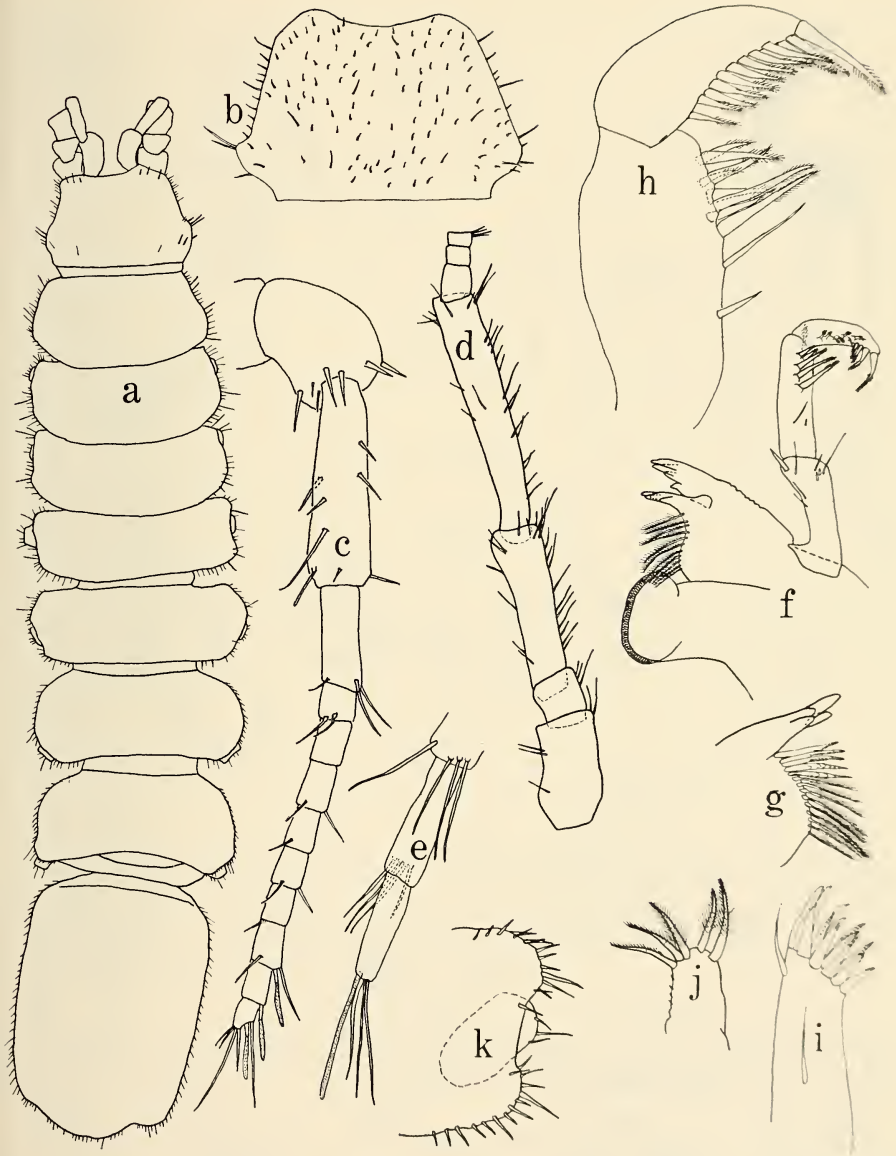

Fig. 1. *Caecidotea carolinensis* (d–e from holotype, other figs from 5.5 mm ♂ paratype or exuvia of same): a, Dorsal view; b, Head, dorsal (exuvia); c, Right antenna 1 (exuvia); d, Antenna 2, proximal segments; e, Same, distal segments; f, Left mandible; g, Right mandible, incisor and spine row; h, Mandibular palp (exuvia); i, Maxilla 1, outer lobe; j, Same, inner lobe; k, Pereonite 4.

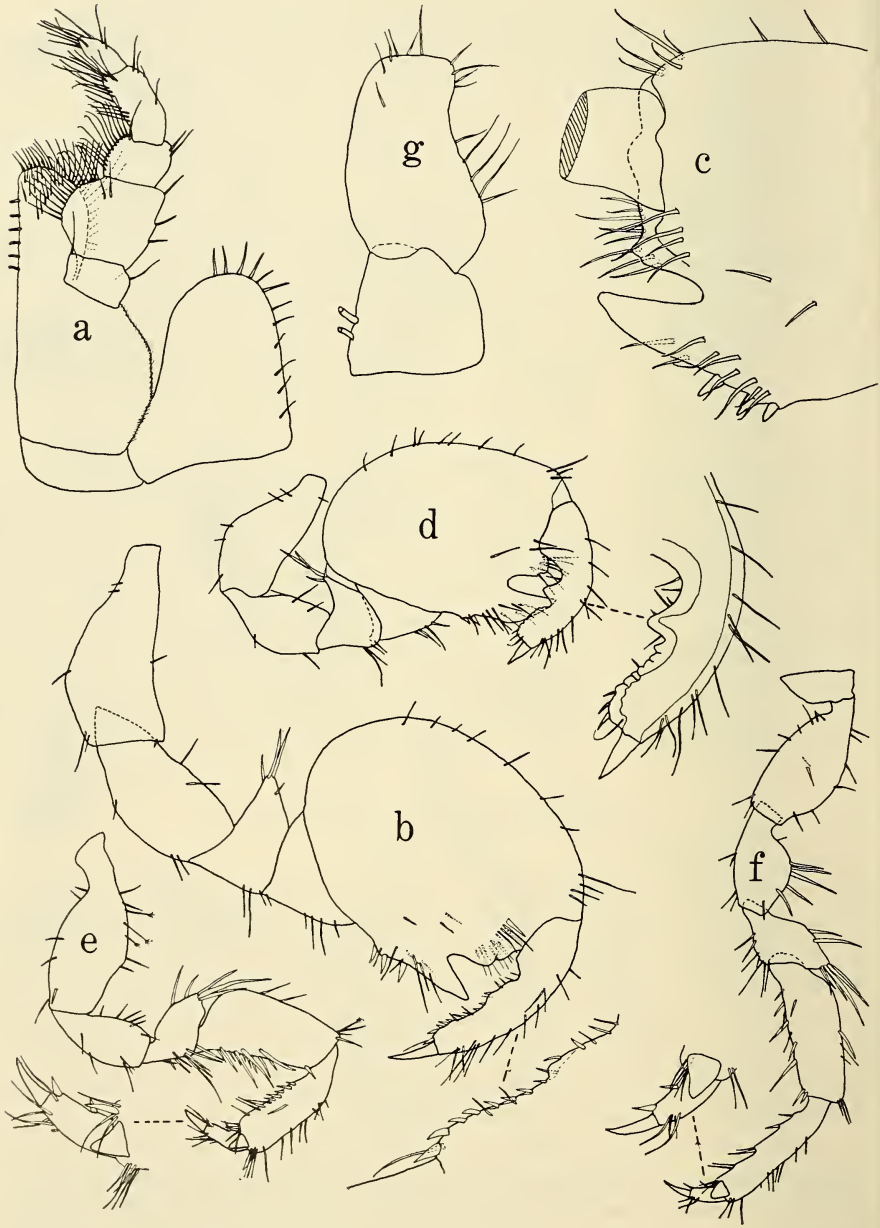

Fig. 2. *Caecidotea carolinensis* (d–f from holotype, other figs. from 5.5 mm ♂ paratype or exuvia of same): a, Maxilliped; b, Pereopod 1; c, Left pereopod 1, medial (exuvia); d, Pereopod 1; e, Pereopod 4; f, Pereopod 5; g, Pleopod 1.

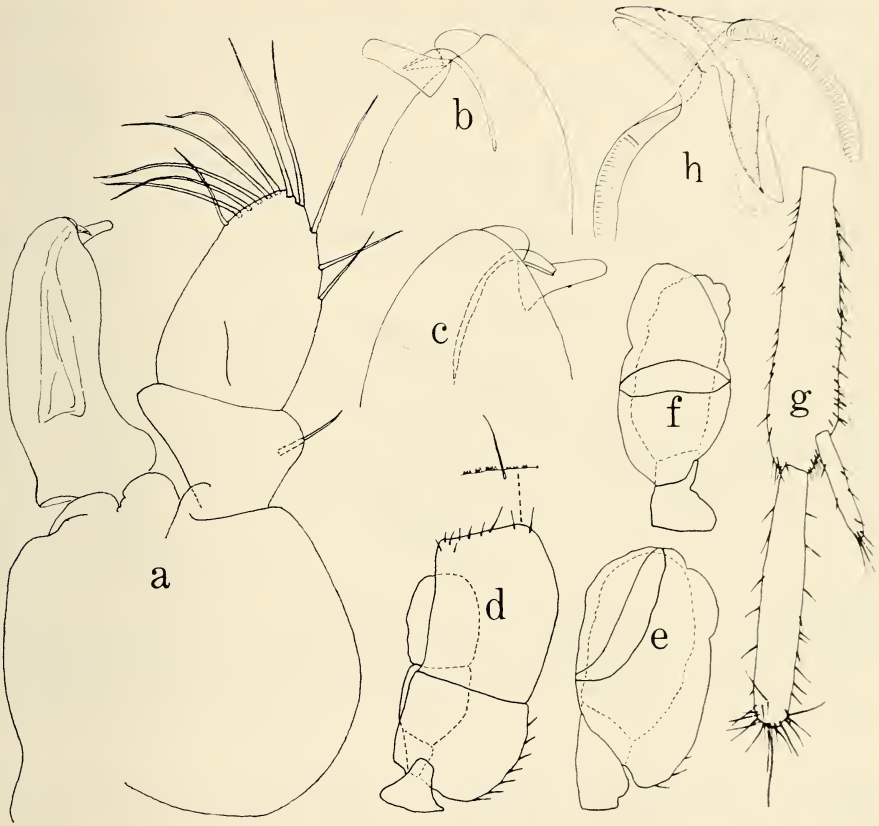

Fig. 3. a–g, *Caecidotea carolinensis* (g from holotype, other figs. from 5.5 mm ♂ paratype or exuvia of same): a, Pleopod 2, posterior; b, Pleopod 2, tip of endopod, anterior (exuvia); c, Same, posterior; d, Pleopod 3; e, Pleopod 4; f, Pleopod 5; g, Right uropod, dorsal. h, *Caecidotea richardsonae*, syntype, tip of ♂ pleopod 2 endopod, anterior (from slide prepared by Steeves).

last segment of peduncle about 1.5× length of preceding segment; flagellum with 46 (5.5 mm ♂) to 55 (holotype) segments; apical segment with esthete.

Mandible with 4-cuspate incisors and lacina; spine row with 11 spines in left mandible, 14 spines in right mandible; segments 2 and 3 of palp each with row of spines with robust bases and slender plumose tips. Maxilla 1, outer lobe with 13 robust apical spines and 1 subterminal seta; inner lobe with 5 apical plumose setae and 4 spinules on distal part of medial margin. Maxilliped with 5–6 retinaculae.

Pereopod 1 propus 1.2–1.4× as long as wide; palm with proximal process

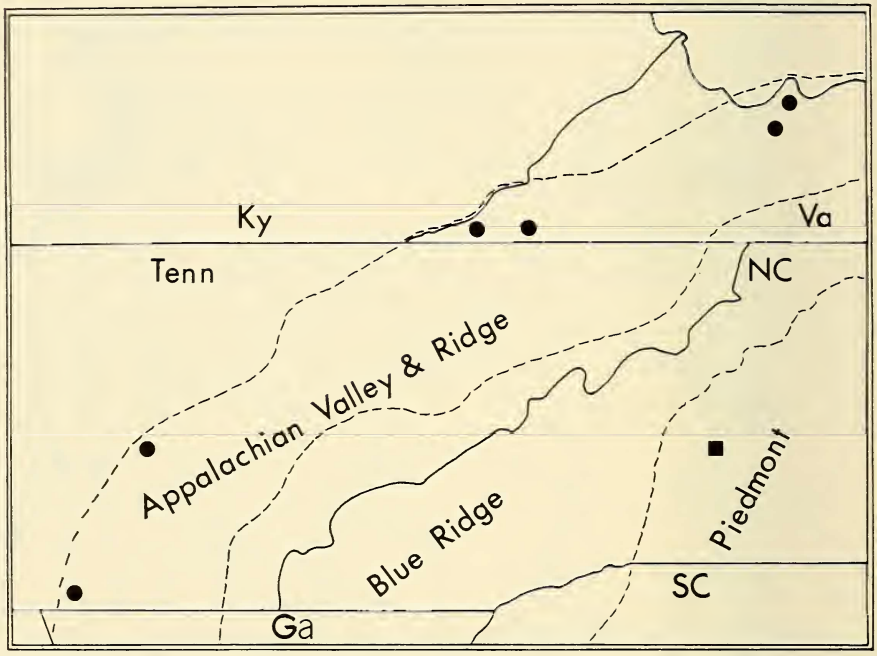

Fig. 4. Known distribution of *Caecidotea richardsonae* (circles) and *C. carolinensis* (square).

absent, its usual position occupied by 3 spines, and large blade-shaped median process separated by deep cleft from shorter, weakly bicuspid distal process; dactyl flexor margin with proximal rounded boss and distal row of spines or tubercles, depending on maturity (compare Figs. 2b and 2d). Pereopod 4 moderately setose; dactyl with 2 spines on flexor margin.

Pleopod 1 longer than pleopod 2; protopod about 0.6 length of exopod, with 2 retinaculae. Exopod about 0.7 as wide as long, with about 4 setae on distal margin, 2–3 subterminal, 4 on distolateral lobe, and 4–5 on concave lateral margin. Pleopod 2 exopod, proximal segment with long non-plumose seta; distal segment oblong, with 9–11 non-plumose setae on margin of distal part. Endopod more than 2× as long as width at base, nearly straight; basal apophysis low, broadly rounded; tip of endopod ending in 4 processes: (1) lateral process well developed, extending distolaterally nearly perpendicular to axis of endopod, digitiform; (2) cannula just distal to and extending obliquely across posterior surface of lateral process, about half length of lateral process, beak-shaped; (3) mesial process low, rounded, extending distolaterally posterior to cannula; (4) caudal process broadly rounded. Pleopod 3 exopod, proximal segment about 0.6 length of distal segment, with about 7 setae on lateral margin;

distal segment with about 10 setae on straight distal margin; margins of both segments minutely serrate.

Uropod rather setose; protopod about 2.6× length of exopod and 1.2× length of endopod; endopod spatulate.

Female.—Unknown.

Etymology.—Named after the state of North Carolina.

Relationships.—*Caecidotea carolinensis* is closest morphologically and geographically to *C. richardsonae* Hay (1901), redescribed by Steeves (1963) and *C. catachaetus* (Fleming and Steeves, 1972). The ♂ pleopod 2 endopod tip in all 3 species has an elongate digitiform lateral process, a beak-shaped cannula (both extending distolaterally), an inconspicuous mesial process, and a broadly rounded caudal process. The accounts of *C. richardsonae* by Steeves (1963) and of *C. catachaetus* by Fleming and Steeves (1972) do not include a caudal process, but we found this structure to be present in slides prepared from type-material of both species. (Fig. 3h). Steeves also omitted mention of the strong sclerotization of the endopod proximal to the tip in *C. richardsonae*; this sclerotization is not found in *C. carolinensis.*

The ♂ pleopod of *C. carolinensis*, *C. richardsonae*, and *C. catachaetus* are similar, all having a well developed distolateral lobe, a feature shared also by *C. hobbsi*, *C. kendeighi*, *C. kenki*, *C. spatulata*, and *C. tridentata.* The ♂ pereopod 1 of *C. richardsonae* and *C. catachaetus* lack palmar processes, structures well developed in *C. carolinensis.* A ♂ pereopod 1 propus similar to that of *C. carolinensis* is found in *C. franzi* (Holsinger and Steeves, 1971). Both have a rudimentary proximal process apparently situated on the posterior margin rather than the palm and represented by 3 spines, and a strong median process separated from a weakly bicuspate distal process by a deep cleft. The ♂ pleopods 1 and 2 of *C. franzi*, however, are radically different from those of *C. carolinensis.*

Distribution.—*C. carolinensis* is known only from Bennett's Mill Cave, a small tectonic (fissure) cave located on the bank of Muddy Creek (Holler, in litt.). This cave is situated within the western Piedmont Province (Fig. 4). The localities where *C. richardsonae* and *C. catachaetus* are known to occur (Steeves, 1963; Fleming and Steeves, 1972) all lie within the Appalachian Valley and Ridge Province, hence these 2 species are isolated from *C. carolinensis* by the intervening Blue Ridge Province. Since the populations of *C. richardsonae* and *C. catachaetus* occur in rather disjunct areas of karst, it would not be surprising to find evidence of evolutionary divergence among the populations of either or both species.

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Footnote

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